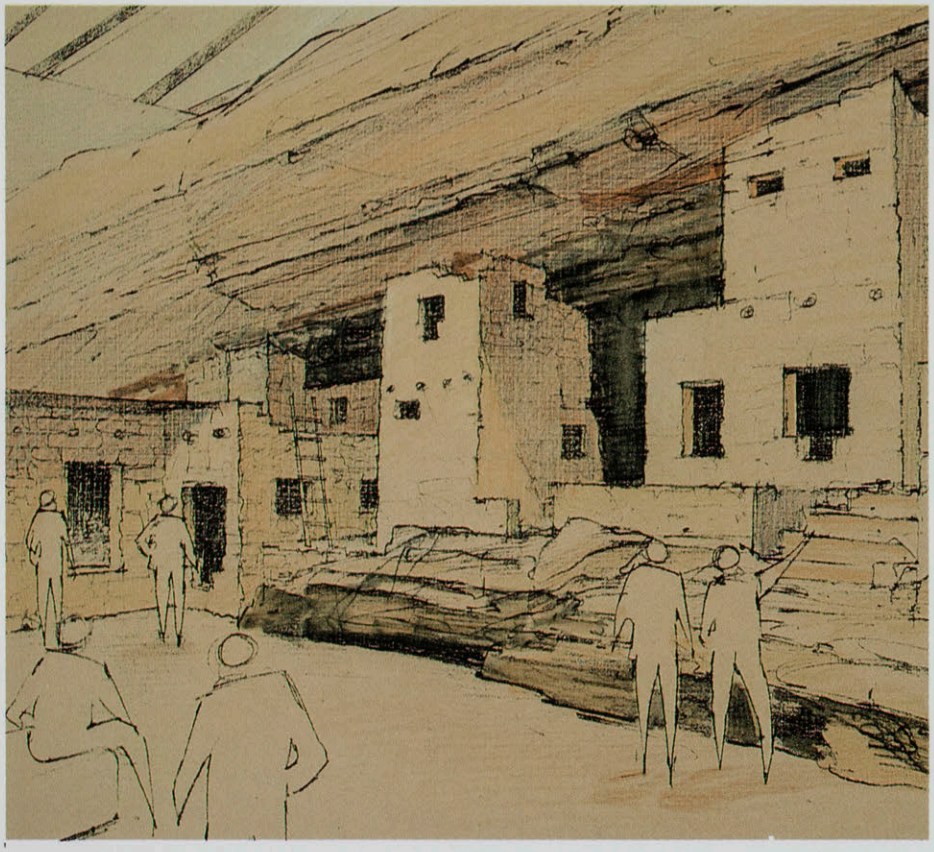
TERRA

THE NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY
VOL. 26, NO. 5 • MAY/JUNE 1988

Special Issue

ART FROM THE NAVAJO LOOM

MUSEUM ON THE MOVE



A two-story replica of a prehistoric Pueblo cliff dwelling will be the highlight of the Times Mirror Hall of Native American Cultures.

Gift from Chandis Securities Company Supports Times Mirror Hall of Native American Cultures. The Natural History Museum gratefully thanks the Chandis Securities Company for its generous grant of $250,000 toward construction of the Times Mirror Hall of Native American Cultures, scheduled to open in 1989. This gift is the most recent in the long-standing history of the Chandis Securities Company's support of the museum.

"We are pleased to contribute to this project and support the Natural History Museum," says Warren B. Williamson, President of Chandis Securities Company. The Hall of Native American Cultures will be a significant addition to the museum, enriching its contribution to the Los Angeles community.

"Because Los Angeles has the highest concentration of Native Americans in an urban area, the hall will affirm their cultural identities and serve as a resource for those whose legacies it holds in trust," says William Mingst, Chairman, Native American Hall Committee.

Three collections of Native American artifacts from Spanish land-grant families form the nucleus of the museum's Native American collections and will be housed in the new hall, designed by world-renowned Canadian exhibit designer Jean-Jacques André working with Dr. Margaret Hardin, curator of the exhibit. Mr. André's previous work includes the Provincial Museum in Victoria, British Columbia. He is known for his innovative use of habitat design and his extensive work with Native American communities as designer for tribal museums.

Otis Chandler, Vice Chairman, Native American Hall Committee, says "Each year the Times Mirror Hall of Native American Cultures will bring examples of these arts, interpreted in the contexts that create meaning for their makers, to an audience of 1.5 million people, among them 200,000 schoolchildren from all socioeconomic backgrounds."

This generous grant from the Chandis Securities Company will help make possible the presentation of this important new hall to museum visitors and provide an excellent educational resource to the community at large.

New Exhibit Hall to Celebrate Legacy and Contemporary Contributions of Native American Cultures. A major goal in developing the new Times Mirror Hall of

Continued on page 4

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COVER: This special issue of TERRA celebrates the creative gift of the Navajo weaver. Photograph by Dick Meier and John De Leon.

Dedicated to
KATE PECK KENT
(1914–1987)
Scholar and enthusiast
of fabrics from around the world,
she enriched our understanding
of textile production from both historical
and aesthetic points of view.

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Native American Cultures has been to celebrate the diverse heritage of Los Angeles's Native American community. Native Americans living in Los Angeles come from many different tribes and cultural backgrounds all over North America.

This innovative new hall will house one of the nation's most important collections of Native American art and artifacts.

A two-story reconstruction (pictured on pg. 2) of a prehistoric Pueblo cliff dwelling will be the highlight of the hall. A central California river bank habitat will dramatize Pomo acorn processing techniques, and the museum's extensive collection of Navajo textiles combined with historic photographs will tell the story of the Navajo people.

Special pieces of Native American artwork from the museum's anthropological collections will be showcased, including California and Great Basin baskets, southern California archaeological materials, and Southwest pottery.

The second floor of the hall will be devoted to Native American arts, culminating in an innovative changing gallery to spotlight contemporary Native American art forms. These contemporary, thematic exhibits will keep abreast of the vital artistic changes within the Native American community and preserve them for future generations. "All the best collections were new when they were acquired," explained Dr. Margaret Ann Hardin, head of the Anthropology Section at the museum. "Collecting the contemporary is part of the museum's responsibility to future generations.

"We want to emphasize how Native Americans have preserved their heritage under the most difficult of circumstances," said Dr. Hardin. "By showing the process of change through time, we show that modern Native American culture is not static nor a thing of the past. The continuing survival of American Indian culture and its capacity to contribute to our changing world is a major theme of the exhibit."

This approach promises an exhibit with special emphasis on the vital, changing culture of modern Native Americans. Says Hardin, "It will be a living hall, about people. The most important thing for the public to learn from this exhibit is that Native Americans are still here, right here in Los Angeles, as classmates, neighbors, and fellow community members.

May Company California's Generous Support Makes First Exhibition of Hearst Collection Possible. The museum gratefully acknowledges the vital support May Company California has given to the current major exhibition **Art From the Navajo Loom: The William Randolph Hearst Collection.** May Company California's generous gift has made the premiere display of these exquisite textiles possible.

A gem of the museum's anthropological holdings, this important collection of nearly two hundred textiles has never been completely exhibited. The current exhibition, selected from the masterpieces of Navajo rugs, blankets, and serapes Hearst donated to the museum in 1942, features rare, early pictorial blankets and an abundance of eye-dazzling serapes showcasing the weavers' virtuosity.

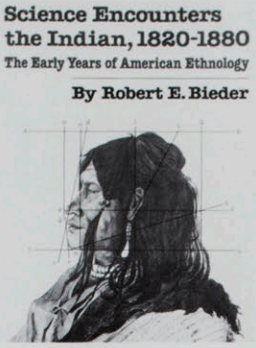
Chase Manhattan Corporation Grant Helps Preserve Hearst Textile Collection. Thanks to a grant from The Chase Manhattan Corporation, the continued beauty of the museum's impressive collection of Navajo textiles will be ensured. This support has made possible the conservation and restoration of the textiles and will provide for their continued care. The museum is grateful for this important contribution to its ethnological collections.

Textile collections such as the extensive William Randolph Hearst collection present unique problems of restoration and preservation. Many of the over two hundred exquisite textiles were really used as blankets and rugs and may have been stained or damaged by ordinary household use before they became treasures in the museum's anthropological holdings. Despite careful attempts to preserve the priceless textiles since Hearst donated the collection in 1942, many of the magnificent samples of Navajo weaving needed some restoration before being presented to the public in the current museum exhibition, **Art From the Navajo Loom: The William Randolph Hearst Collection.**

Book to Accompany Navajo Textile Exhibit. A new book, *Navajo Textiles: The William Randolph Hearst Collection*, will be published in summer 1988 by the University of Arizona Press. Written by Nancy J. Blomberg, Assistant Curator of Anthropology at the museum and Curator of the textile exhibition, the book outlines the history of Hearst's involvement with Navajo textiles. It is a detailed scholarly analysis of each textile in the collection: Ms. Blomberg examines such characteristics as yarns, dyes, and weaving techniques. A full-color photograph of each textile is included in the book.

The University of Arizona Press and an anonymous donor have made possible a valuable resource for further study of this outstanding collection.

BOOK REVIEWS



SCIENCE ENCOUNTERS THE INDIAN, 1820–1880: THE EARLY YEARS OF AMERICAN ETHNOLOGY by Robert E. Bieder. University of Oklahoma Press, 1986. Cloth, 294 pp., $19.95.

In this extremely well-documented account of the formative years in American Indian ethnology, Robert E. Bieder provides a penetrating insight into the awkward coming of age of modern anthropological science. Focusing on five of the most prominent nineteenth-century American enthnologists—Albert Gallatin, Samuel G. Morton, Ephraim George Squier, Henry Rowe Schoolcraft, and Lewis Henry Morgan—this study probes the challenges and contradictions of post-Enlightenment scientific studies on North Americans and their environment. This work also effectively gauges the "scientific" analysis of American aborigines through the value-laden cultural prism of educated Anglo-Americans.

Bieder's treatment discloses North American scientific racism and in a larger context reveals the limitations of a fledgling science caught in the intellectual purgatory of post-Enlightenment scientific investigation. Through these pioneering ethnologists emerges a quasi-scientific search for the true nature of the Indian encumbered by a mindset steeped in naive rationalism, fundamental Christianity, and paternalistic racism.

The ideological foundation shared by these figures is composed of the Enlightenment concepts of rationalism and progress. Perhaps this explains the author's treatment of Albert Gallatin as the most sympathetic of the five ethnologists considered. Gallatin, the true pioneer of early American ethnology, embodied the scientific enlightenment that matured late in North America. While assessing the American Indian against the backdrop of European and Anglo-American "progress," this highly-esteemed statesman-scientist nonetheless exhibited an intellectual sensitivity somewhat lacking in his successors.

When Gallatin died at mid-century,

Continued on page 25

WEAVING A LEGEND

by NANCY J. BLOMBERG

Beginnings. Navajo mythology recounts a legend whereby Spider Woman taught Navajo women to weave. Scholars, however, have not been able to pinpoint the exact date of the beginnings of Navajo loom weaving. Most evidence points to a time after the tribe migrated into the Southwest from the North, and most likely in the mid-seventeenth century. Additional evidence in the form of loom and design similarities suggest a Pueblo derivation.

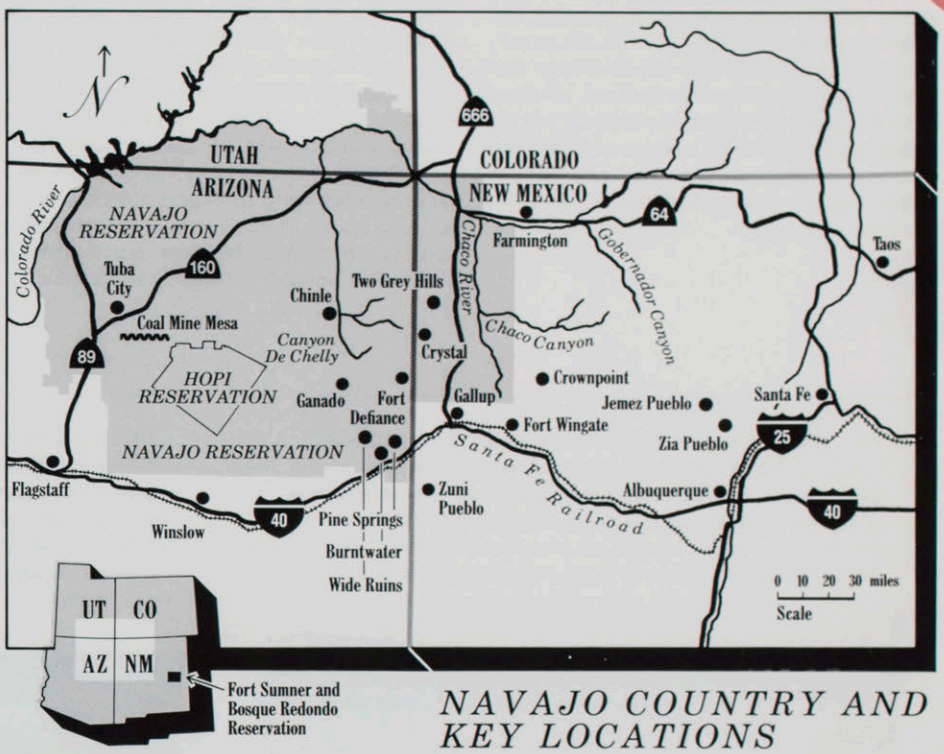
Since A.D. 1100 Puebloan peoples have been raising cotton and weaving it into clothing on simple upright looms. Sheep, with their warm woolen fleece, did not enter the Southwest until more than four centuries later with the arrival of Spanish explorers.

Oppressive Spanish rule over the years caused Puebloan peoples to revolt and then seek asylum among Navajo groups. Such close contact gave the Navajo an opportunity to learn the techniques of loom weaving.

Over the years the flexible and innovative nature of the Navajo people has enabled them to adapt to ever-changing circumstances. When introduced to cultures and ideas different from their own, the Navajo have usually selected and adapted parts of each to their best advantage.

In the three centuries that the Navajo have been weaving, their lives have been profoundly changed, and these changes are directly mirrored in their weavings. Unlike their Pueblo teachers, who wove textiles primarily for their own ceremonial use and thus maintained conservative patterning, Navajo weavers produced for a very different, secular market. They began weaving textiles patterned with simple horizontal stripes, progressed through elegant Classic-period serapes and chief-style blankets, dynamic Germantown eyedazzlers, whimsical pictorials, somber turn-of-the-century rugs, to the spectacular technical refinement of their present work.

These remarkable changes can be loosely organized into three categories: Classic period, 1650–1868; Transitional period, 1868–90; and Rug period, 1890–present.



NAVAJO COUNTRY AND KEY LOCATIONS

Mastery of the Art: The Classic Period, 1650–1868. The earliest actual Navajo textiles are known only from archaeological fragments excavated in the Gobernador Valley of New Mexico dating to the middle of the eighteenth century. These fragments, as well as references found in early Spanish documents, indicate that the early textiles were made of wool, the designs produced were mainly simple stripes, and that the weaving techniques included sophisticated diamond and diagonal twill as well as plain tapestry.

These early years were a time of development. The Navajos wove utilitarian items of clothing such as blankets, which they wore as outer garments for protection from the elements, dresses, and belts for their own use as well as for trade to other Indian groups. Although blankets were generally woven on the loom in a longer-than-wide shape, they were actually worn in exactly the opposite orientation—with the width across the shoulders and joining the ends in front.

While the first textiles bore striped designs, by the early nineteenth century the spectacular serape style was emerging. The designs of elaborately terraced zigzags and diamond motifs in a red, white, and blue color scheme demonstrated the weaver's incredibly high degree of technical excellence. Indeed, so impressed with the Navajo serape was Lieutenant James H. Simpson, U.S. Army, that he remarked in his diary, kept while on an exploring expedition through Navajo country in 1848, that the Navajos made "the best blankets in the world!"

During this period weavers augmented the natural white and brown colors of the shorn sheep with navy blue and vivid reds obtained from the Spanish. The blue came from the indigo plant dye, and they took the red from commercially woven bolts of bayeta (baize) cloth. Unable to obtain bright red colors from local plants, the Navajo avidly sought to procure this bayeta and then tediously unraveled it, thread by solitary thread! The yarn was then plied to produce a thickness equal to the weight of the other yarns to be used in the blanket and rewoven into the new textile. Contrary to popular stories, this raveled yarn was not obtained from the jackets of dead U.S. soldiers. Reds with a blue or purple tinge generally were obtained from imported cloth. Later orange-red shades were often unraveled from bolts of American flannel.

One of the most widely recognized blankets to develop during the Classic period was the so-called chief style. Like the Pueblo wearing blanket from which it no doubt evolved, the Navajo chief blanket was woven broader than it was long with wide horizontal stripe elements dominating the design. Over the course of the nineteenth century the design of this type of blanket evolved in very rigid and easily identifiable patterning phases. The name "chief blanket" is really a misnomer, for the Navajos did not have tribal chiefs. These particular blankets were considered rare and valuable trade goods, however, and as such, were carried to distant tribes over lengthy trade routes. Ownership of such a valuable item would no doubt have been limited to persons of some wealth and achievement and thus perhaps the origin of the name. (For further information on the chief-style blanket, see Kathleen Whitaker's article on page 11 in this issue.)

From simple horizontal stripes to spectacular serapes the Navajo weaver achieved a level of excellence in the Classic period seldom equaled until recently. Not only did the weaver produce a functional blanket but also a premier work of art. The years from 1863 to 1868, however, were to change Navajo textiles and Navajo life forever.

Repeated skirmishes between U.S. Government troops and Navajos caused the Army to mount an all-out effort to subjugate the Navajos once and for all. Under the leadership of Colonel Kit Carson, soldiers literally herded the Navajo from all over Arizona and New Mexico to Bosque Redondo in eastern New Mexico with only the possessions they could carry on their backs. This Long Walk to Bosque Redondo near Fort Sumner was the beginning of nearly five years of captivity for the Navajo.

This textile woven ca. 1850–60 embodies all the characteristics of Classic Navajo serapes: horizontal design layout of carefully stepped zigzag lines sometimes joining to form diamonds; the use of narrow stripe elements; a predominant color combination of red, blue, and white; and the use of imported cloth to create finely raveled yarns rewoven in an incredibly tight weave.

Chief-style blanket, third phase, ca. 1870–75. The central diamond motif, along with half and quarter diamonds along the edges, are characteristic of the third phase of patterning through which the chief-style blankets evolved over the years. When wrapped around the body of the wearer, the half and quarter diamonds woven on each side would join in the front to complete the patterning.

Changing Directions: The Transitional Period, 1868–90. Exposure to new ideas and materials at Bosque Redondo changed Navajo life forever. Returning home in 1868, the Navajo discovered their lands overgrown and their sheep herds destroyed. With the raw material for making blankets in short supply, they relied heavily on the Western-style clothing they had been issued by the government. Wool shortages and American clothing notwithstanding, Navajo women did continue to weave, but for a market in transition.

A multitude of facts began to affect the look and feel of the Navajo blanket. Already-processed commercial yarns and bright chemical dyes were beginning to find their way onto the reservation. Eager to bypass the tedious processing required in shearing, spinning, and dyeing their own wools, Navajo women readily accepted the new yarns.

Design innovations occurred in response to Navajo exposure to new stimulus at Bosque Redondo, among them strikingly patterned Mexican serapes. An additional factor in the design change was the shift in function of the textile away from a wearing blanket toward use as a floor rug.

The arrival of the railroad in the 1880s and the consequent opening up of the West ended the relative isolation of the Navajo, and a new Navajo textile was born.

New Markets: The Rug Period, 1890–Present. Trading posts and their owners were firmly entrenched on the reservation by the late nineteenth century. Licensed by the U.S. Government to provide goods and services to the Indians, their traders' lives became intertwined with the lives of the Navajos. Their impact on the Navajo textile was enormous. They provided new materials, new design inspiration, and a new market.

No longer primarily items of wearing apparel, Navajo textiles had evolved into thick, heavy floor rugs suitable for use in Victorian homes. New design combinations enclosed within borders were created by the traders to please the taste of the Eastern buyer. Some traders such as J. B. Moore at Crystal, New Mexico, published mail-order catalogues of available rugs in an attempt to reach an even broader market.

This watercolor, painted by Karl Bodmer in 1833, shows Kiasax, a Piegan Blackfeet man, wearing a first-phase chief-style blanket woven by the Navajo. These very distinctive blankets were highly prized by tribes adjacent to the Navajos and were widely traded on the Great Plains as valuable commodities. Photo courtesy of the Joslyn Art Museum, Omaha, Nebraska.

Toward the end of the nineteenth century new commercially prepared yarns and chemical dyes were being used by Navajo weavers to create startling textiles with eyedazzling patterns.

By the end of the century the Santa Fe Railroad was looking for ways to increase the flow of tourists to the Southwest. To this end, the Fred Harvey Company Indian Department (an offshoot of the Harvey restaurant and hotel chain) was established in 1901 in Albuquerque, New Mexico, immediately adjacent to the railroad tracks. Tourists could easily step off the train, make purchases, and reboard quickly. Indian weavers, potters, and silversmiths were hired to demonstrate their skills. A caption on a postcard from the period describes the experience:

In the Indian Building at Albuquerque are gathered some of the finest collections of Indian handicrafts in existence. A section of the building is devoted to a salesroom, and many of the exhibits suggest practical uses of the various articles, as furnishings and decorations.

To most travelers the greatest attractions of The Indian Building are its glimpses of native industry. Patient Navaho squaws may be seen weaving blankets while their men make crude articles of silver jewelry.

All trains stop twenty-five to thirty minutes at Albuquerque. Conductors will give advance notice in The Indian Building of the departure of trains.

The Indian Department experiment was an enormously successful venture for the railroad and quickly assumed a life of its own. A very large part of its operation was the marketing of Navajo textiles—both rugs and blankets. Like many other traders of the period, the Fred Harvey Company helped to shape the Navajo textile of the time.

The twentieth century has seen continued innovation in the product of the Navajo loom, and today weaving is alive and well on the reservation. Ann Lane Hedlund's work with contemporary weavers (see this issue pages 15–20) strongly confirms the vitality of this tradition.

Continued on page 10

Page 9: Exterior of Indian Building, Fred Harvey Company, Albuquerque, New Mexico, ca. 1907–15. Early train travelers are shown making purchases of jewelry, basketry, and pottery from Indian women who are seated on the ground and wrapped in plaid blankets and shawls. By deliberately placing sales rooms in close proximity to key railroad stops, the Harvey Company shops were able to capture the immediate attention of passengers. Photo courtesy of Special Collections, University of Arizona Library, Tucson.

This page reproduced from J. B. Moore's 1911 mail order catalogue shows one Navajo rug available for purchase. As the owner of the trading post at Crystal, New Mexico, from 1911 to 1915, Moore created designs he hoped would please Eastern buyers and then encouraged local Navajo weavers to produce rugs according to his specifications. Photo courtesy Seaver Center for Western History Research.

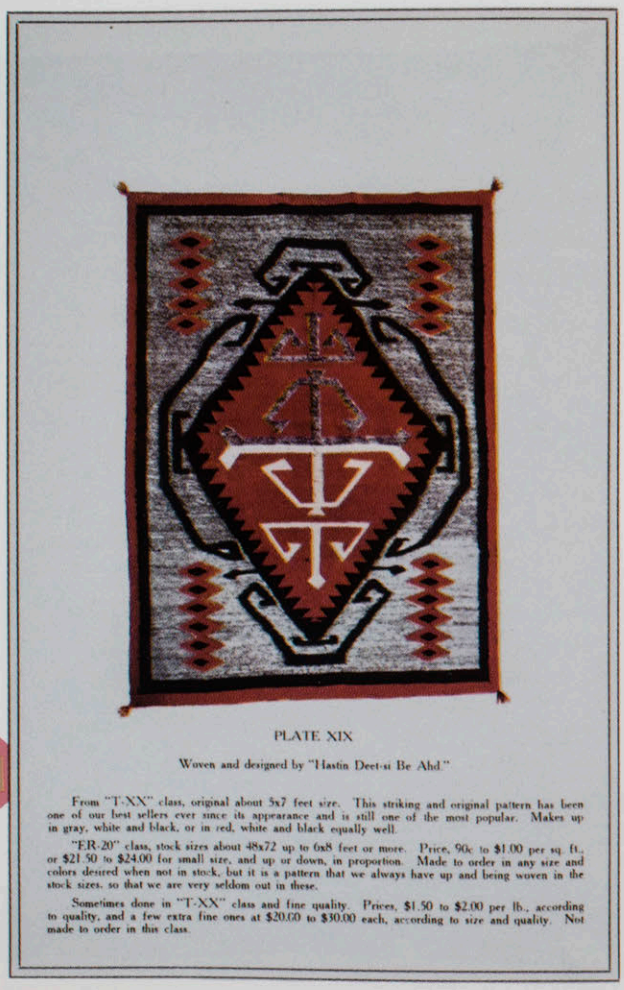


PLATE XIX

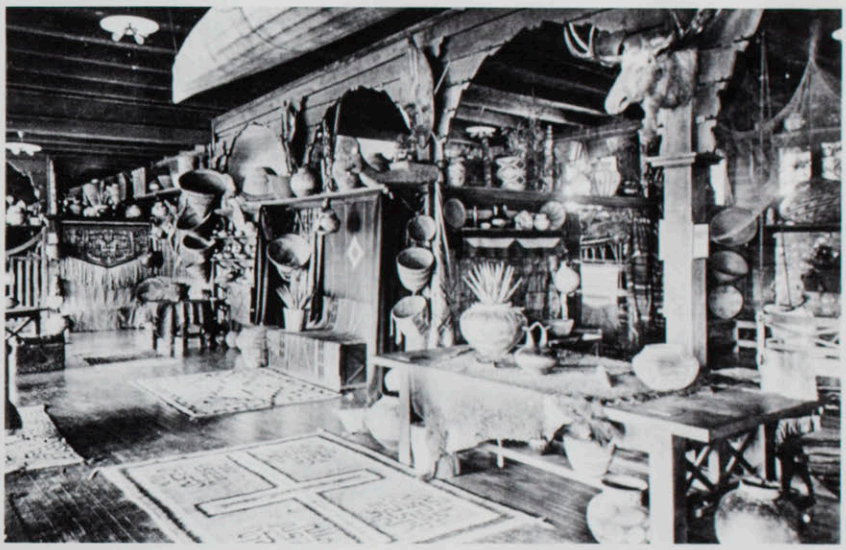
Woven and designed by "Hastin Deet-si Be Ahd."

From "T-XX" class, original about 5x7 feet size. This striking and original pattern has been one of our best sellers ever since its appearance and is still one of the most popular. Makes up in gray, white and black, or in red, white and black equally well.

"ER-20" class, stock sizes about 48x72 up to 6x8 feet or more. Price, 90c to $1.00 per sq. ft., or $21.50 to $24.00 for small size, and up or down, in proportion. Made to order in any size and colors desired when not in stock, but it is a pattern that we always have up and being woven in the stock sizes, so that we are very seldom out in these.

Sometimes done in "T-XX" class and fine quality. Prices, $1.50 to $2.00 per lb., according to quality, and a few extra fine ones at $20.00 to $30.00 each, according to size and quality. Not made to order in this class.

Compare this rug from the Hearst collection against the plate from the J. B. Moore catalogue. Although no documentation has been found to prove exactly where Hearst bought this rug, the similarities in design and materials suggest its origin at the Crystal, New Mexico, Trading Post.



Interior of Indian Building, Fred Harvey Company, Albuquerque, New Mexico, 1905. A close examination of this photo reveals the amazing diversity of artifacts being sold by the Harvey Company, including Southwestern baskets, pottery, and textiles; Samoan bark cloth; Maori carvings; Zulu shields; a Chilkat blanket; miniature totem poles; and even a full-size Eskimo kayak suspended from the ceiling. Photo courtesy of Special Collections, University of Arizona Library, Tucson.

Art from the Navajo Loom: The William Randolph Hearst Collection, *drawn solely from the collections of the Natural History Museum, presents both the creative gift of the Navajo weaver along with the changing history of the Navajo people through the spectacular collection of textiles amassed by publishing mogul William Randolph Hearst. Assembled in the early years of this century, it represents one of the foremost private collections and vividly illustrates the depth and diversity of the Navajo weaver's art from 1800 to 1920.*

It is especially appropriate that this exhibit be presented in this our seventy-fifth diamond jubilee year, for the Hearst collection is truly one of the gems of our anthropological holdings at the Natural History Museum.

Art from the Navajo Loom will appear only at the Natural History Museum and will run from March 25 to July 31 in the Olympics Gallery.

Continued from page 8

Enter Hearst. To most people the name William Randolph Hearst is synonymous with newspaper publishing. To others, the mention of his name will bring to mind the magnificent castle atop the hill at San Simeon, lavishly filled with room after room of European antiquities. But few people know of his passion for collecting American Indian artifacts, most notably Navajo textiles.

Hearst's collection was built largely from the holdings of the Fred Harvey Company Indian Department. During the first portion of this century he amassed more than 200 pieces representing nearly all the major types of Navajo textiles woven between 1800 and 1920. Existing records reveal a fairly clear picture of Hearst's patronage of the Harvey Company as well as the depth and direction of his interests.

Hearst's first contact with the Harvey Company was apparently just after the turn of the century when he viewed their small, temporary exhibit of Indian artifacts. He sought to purchase a few pieces as a gift for his mother, Phoebe Apperson Hearst, but was initially refused by Herman Schweizer, manager for the company because the pieces in the exhibit were not for sale. Hearst pressed the matter, Schweizer relented, and a forty-year association was begun.

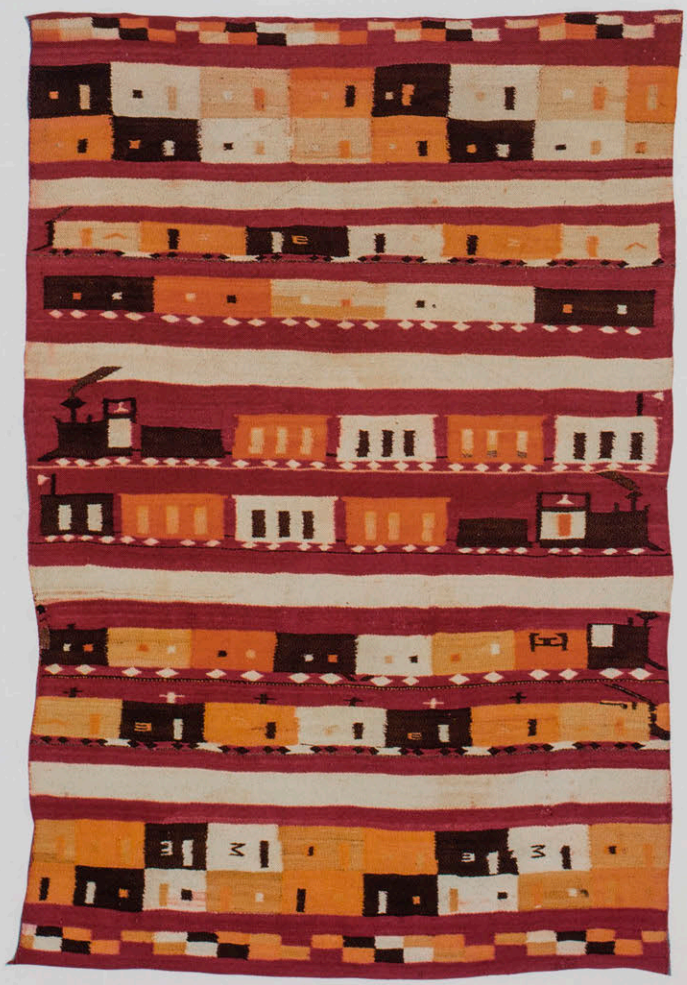
Although Hearst had developed a reputation in the antiquities trade as being a somewhat indiscriminate collector, his interest in Navajo textiles was fairly well directed. Surviving correspondence reveals his intention to amass a large collection with such statements as "send me a considerable number of your best blankets" and "send me a lot of 1st class blankets." Other letters, however, reveal more specific requests such as "chiefs blankets or all Bazetta [*sic.*] blankets" and "ones with odd designs or figures of men or animals."

Over the forty years that Hearst collected Navajo textiles he clearly accomplished his stated goal of amassing a collection of "real treasures," one that included eighteen serapes, thirty-nine chief-style blankets, forty-two child's/saddle blankets, and thirty banded background blankets.

In 1942 the Natural History Museum of Los Angeles County (then the Los Angeles County Museum of History, Science and Art) received a donation of 222 American Indian artifacts, with the bulk being Navajo textiles, from Hearst. Careful scholarly unraveling of the combined histories of these artifacts creates yet another legacy of the eclectic and omnivorous collecting passion of William Randolph Hearst and furthermore gives testimony to the resilient and creative skills of the Navajo weaver.

Nancy J. Blomberg is Assistant Curator in the museum's Anthropology Section. She is the curator of Art from the Navajo Loom *and has recently completed a book entitled* Navajo Textiles: The William Randolph Hearst Collection *published this year by the University of Arizona Press.*

William Randolph Hearst. Photo courtesy of the Hearst Corporation, New York.



In building his Navajo textile collection, Hearst actively sought to include the unusual as well as more representative pieces. This textile bearing the image of a train includes such details as stylized engineers and billowing smoke.

A NAVAJO PHASE II PICTORIAL CHIEF BLANKET

by KATHLEEN WHITAKER

From the inner sanctum of a small pickup truck sitting in the parking lot of a Los Angeles supermarket, an incredible piece of Navajo weaving history was pulled from the dark isolation of its past. The textile was unfurled ever so slowly as if rolling away the tides of time; an image of the Navajo spirit lay exposed to the present.

What rested on the bed and tailgate of modern technology was a Navajo Phase II pictorial chief-style blanket—the earliest known—that had been sequestered for almost 120 years. Incredibly, this cloak symbolizing human perception and creativity had been plucked from obscurity in Paso Robles, California, one month earlier by an astute art dealer from Bakersfield. Thus, in November 1985, its modern history began.

The prearranged parking lot meeting was scheduled to verify cultural identification and to approximate a date of manufacture for what was believed by this author to be just another Navajo blanket. While it seems almost incongruous now, the meeting was an intrusion on the more pressing matter of editing a book on Navajo weaving. This document from the Navajo loom, however, added a few more pages to that book and to the annals of Navajo weaving history.

A chief-style blanket is a type of man's shoulder blanket, the origin of which may stem from two weaving traditions: the Pueblo Indian and the Spanish. Divided into three, possibly four phases of development, its wider-than-long proportion comes from the ancient style of the Pueblo woman's shawl. The origin of its basic banded and striped design was influenced from outside Navajo culture. Similar styles are noted in the art forms of indigenous prehistoric and historic Southwestern cultures and early Spanish blankets. The Navajo may have adapted the layout from one or more of these groups.

The term "chief blanket" is believed to be commercial in origin, given by merchants who conveyed these textiles to non-Navajo trading parties. The earliest chief-style fabric to date was found in a Navajo grave, implying its importance to its owner. Archaeological investigation, however, has not demonstrated any relationship between the blanket and Navajo social organization or status.

The historical path over which this Phase II pictorial chief blanket journeyed is unknown. Internalized in its artistry are clues about the creator, her values, and the culture within which she interacted. Sometime during the middle of the nineteenth century, stimulated by the beauty, the majesty, and perhaps the mystery of the horse, a Navajo weaver projected its image onto one of her loom creations. Her experience and cultural association with the animal was no doubt profound and lingering. From memory she interlocked its power and strength with the threads of her own quiet force. Through this blanket the weaver left a legacy that not only portrayed her own sensibilities, but became the touchstone to the intricacies of her own unique cultural experiences as a Navajo.

This blanket makes concrete the free expression and beauty inherent in individual creativity; it is also a phenomenon that gives testimony to the dynamic, autonomous nature of Navajo culture. Some may argue that all Navajo blankets possess these qualities, that they are all the independent creations of their makers and, as such, they articulate through shape, design, and color a Navajo awareness of the universe. If so, what makes this pictorial fabric unique?

In the three centuries of Navajo weaving history, only three pre-1865 pictorial blankets have been identified. In 1840 Kit Carson purportedly observed a blanket with floral motifs, but its current status is unknown. The earliest extant pictorial textile, employing four tiny birds, is the so-called Chief White Antelope blanket now in the collections of the School of American Research in Santa Fe, New Mexico. It was retrieved from the body of Cheyenne Chief White Antelope at the Sand Creek Massacre in 1864. Then, in 1865, a U.S. Army lieutenant serving under Colonel William Drannon reportedly bought a Navajo blanket for five silver dollars. The design incorporated a horse in each corner in various colors and a man in the center with a spear in his hand. It, too, is lost in history. The existence of this fourth example is a monumental discovery for it is believed to be the oldest extant Navajo pictorial textile in the chief-style tradition.

Unfortunately, the conditions under which the blanket was brought to Paso Robles are unknown. Like many others, this tapestry may have been traded or sold to other Indians in or on the periphery of Navajo territory. A member of a Spanish household or, later, American military personnel during the expansion period in the Southwest, may have acquired it through raids, purchase, or barter. An Indian trader may have been the intermediary of its transport. Whatever the method of acquisition, the blanket no doubt traveled many miles.

If there is no written or oral record of this blanket's origin, how was the existing information obtained? Aside from historical speculation, physical properties such as design, fiber, and dyes played key roles in defining pertinent technical data. These perceived qualities and the ethnohistorical journals and documents provided the critical information needed to evaluate and date this fabric accurately. The absence of a collection date and any known written record gave the study a sense of urgency.

The textile incorporates an early twelve-spot chief blanket design. It is woven with unraveled imported worsted (a hard napless yarn) and S-spun native hand-spun churro wool (churro is a breed of sheep; see page 16 for more about this type of wool) with long-staple, straight fibers. Phase II chief blankets are believed to have been manufactured approximately between 1800 and 1870. The breed of sheep from which the wool came also determines a basic time frame. Imported and native hand-spun fibers and their dyes also helped refine the date.

Chemical evaluation of the colorants in this blanket revealed the use of lac (a resin secreted by the lac beetle) and cochineal (red dye made from the cochineal insect) for the crimson reds and indigo dye plant for the dark blue. Indigo and rabbit brush were combined to produce green. As much as can be determined today, the lac beetle was used as a colorant in the European textile industry during a very early period. Cloth with such dye is believed to be the major import to the Navajo before 1860. This is borne out by the chemical testing of raveled fibers in Navajo blankets before 1860. The use of cochineal is much more consistent in Navajo weaving after this period. Both, however, were used concurrently between 1850 and 1870. The date of manufacture, based on analyzing the yarns and the kinds of dyes used in the blanket, can be established

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A Navajo-woven Phase II pictorial chief blanket dated c. 1855–65. Discovered in 1985, it is the oldest extant pictorial textile in the chief-style tradition. From the collection of Sharon and Charles Aberle.

Close-up of the woven horse motifs in the Phase II chief blanket. These are stylistically similar to Navajo petroglyphs dating to 1800.

Continued from page 11

between 1855 and 1865.

The design layout of the textile exhibits some unusual features. At each end of the blanket are chevron-shaped blocks, which replace the rectangular ones used in most Phase II chief-style blankets. These are woven with crimson-colored raveled material with five indigo-dyed, smaller chevrons serving as interior filler elements. The central band incorporates six convex red rectangular blocks, each containing stiff, elongated indigo-dyed horses with long tails. Each animal has a green bridle. These equine figures are reminiscent of those found on petroglyphs dating to 1800.

Above the backside of each horse are two vertically stacked, terraced, isosceles triangles, one in green and the other in blue. Such motifs are common in Navajo sand paintings; they sometimes characterize holy beings in human form. Loosely translated, the blanket figures may be portraying people on horseback. Should this be the case, they probably do not have any emotional or religious intent since most woven forms are not considered symbolic. Navajo weaving art is secular in nature.

Both the material culture of the Navajo and ethnographic data indicate a certain flexibility and pragmatic approach to weaving innovation. Therefore, in this Phase II pictorial chief blanket, and perhaps in weaving design generally, the building of a pattern reflects the Navajo approach to life. In the main the design is individualized, without rigid controls. It has scattered, isolated elements that reflect independent action and creativity. Moreover, the adaptation of outside design influences demonstrates the processes of continuity and change that are common in Navajo culture.

Beyond the independence of this weaver, there remains in her creation a conscious and subconscious reflection of her social and physical environments. Development of the Phase II pictorial chief pattern resulted not only from her own innovative actions, but from reactions to how members of her group collectively thought, felt, and acted. The artist shared a common information pool with others. This is observed in her use of the standardized zoned layout and the repetitious use of a pattern that characterize the chief style. Above all, in Navajo design as in life, there is a struggle to balance and harmonize the nature of all things. While these ideals are visually captured in this blanket design, also incorporated is a distinct and almost progressive sophistication.

Symmetry analysis is defined as the axial arrangements and motions used by the weaver during the process of design formation. Results of such a study on this Phase II pictorial chief blanket reveal that although it visually represents the rather common zoned layout for pre-1865 Navajo textiles, it is unique among its contemporaries in terms of its symmetrical properties. The reason is the weaver's digression to a chevron shape and the incorporation of the horse. For example, the simple rectangular block found on most Phase II blankets can be reflected across both a horizontal and vertical axis in mirror image. Navajo blankets with these characteristics are identified by the same symmetry classification.

In contrast, the chevron-shaped block and the horse, as a filler element within it, compose a single, fundamental part. Together, as a design unit, they cannot be reflected over a line axis. The unit is therefore asymmetrical and classified by a different symmetry operation. Thus, based on a random sampling of documented and nondocumented Phase II chief blankets believed manufactured before 1865 (including archaeological whole and fragment samples), this pictorial example stood alone in its symmetry classification.

In sum, the analysis of this recently discovered textile represents one example of growth and change in the Navajo weaving tradition and expansionism in their designs. Visually and symmetrically it reflects an evolutionary attitude represented in two assertions: first that the weaver used inherited formations in the design and style. These are observed in the wider-than-long Pueblo-style garment and the repetitious alternation of black and white bands. The result is a compromise between what might be identified as a Navajo aesthetic and outside influence. Second, the dynamic structure of the design is determined by the various and perhaps different experiences of the weaver. In this case, observation of and interest in the horse stimulated growth from a traditional design mode to a more expanded, progressive one. By incorporating this life form into a traditional style, the weaver initiated change.

Because of the improved methods used today in the evaluation of Navajo textiles, this Phase II pictorial chief blanket provides additional information about woven design development prior to 1865. Moreover, as part of the art of the Navajo weaver, this textile is a supreme indicator of that culture's tendency toward adaptation and change.

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CURRENT TRENDS IN NAVAJO WEAVING

Article and Photographs by
ANN LANE HEDLUND

A Navajo rug is the unique product of many people, ideas, materials, and processes. The picture today is far from that of the stereotyped Indian weaver in native costume herding her own sheep, shearing, carding, spinning, washing, and dyeing her own sheep's wool, handweaving a rug with a recognizably "Navajo" pattern in a regional style named after the local trading post, and exchanging that rug at the post for groceries and household items. There is much more to it than that. In fact, the weaver's diverse resources and capacity to absorb influences while still retaining a strong native core give the craft its enduring character today.

Weaving is practiced for different reasons and in varied formats. Many women weave in part because their mothers and grandmothers wove before them, they believe it is what a Navajo woman should know how to do. Weaving is recognized as an integral part of a traditional woman's role. It is a culturally acceptable means of making a living, that is, making an entire way of life. Income is contributed to the household while a variety of other traditional tasks are performed—watching children, herding sheep, tending to household chores, visiting with neighbors.

Other Navajo women perceive of weaving as an appealing alternative to jobs outside the home in which they retain some degree of personal freedom while earning a living. Some use weaving as a means of creative expression, challenging themselves with new designs or finer textures. Increased commitments to high quality and successful marketing indicate an incipient professionalism in the craft. The recording of weavers' names with their work—in trading posts, stores, and museum collections—is a notable trend toward acknowledging the importance of individual artisans. In a remarkable departure from Navajo custom, which shies away from singling out the individual, some weavers have even begun working their initials and a date into a corner of their rugs, signaling the further recognition of individuals' importance.

Not all weavers work consistently through their lives. Some give up weaving when they get married and begin raising a family or when they find a job. Others only begin to weave after they become adults, perhaps after losing a job or after their children begin school. They may be motivated by income or by more esoteric concerns such as fascination with their own heritage. The important issue, however, is that they understand how to weave and, with that understanding, are affiliated with the larger community of craftspeople.

Only a few women make rugs and tapestries without economic incentives, placing personal expression and cultural revival above monetary rewards. Some emphasize weaving as a special marker of Navajo ethnicity. A small number save their handwoven goods for their family as heirlooms representing their cultural and personal heritage. Others, but once again only a few, approach weaving as a hobby, a recreational activity that is relaxing and rewarding in and of itself.

Weaving is hard work and involves many skills that must be controlled carefully and artfully. Today, weavers continue to work at the same upright loom that was adopted by the Navajo from Pueblo Indian sources in the seventeenth century. The relatively simple frame loom and home-made tools are major elements that have in fact *not* changed to any great extent over the past centuries.

Beyond the basic tools and processes, weavers have many choices in raw materials, designs, and marketplaces. There are also choices concerning where, with whom, and how they practice the craft. Their decisions chart the course for major trends and changes in current weaving.

And the Navajo Indian Reservation itself is changing. Where once mechanized transportation was virtually impossible, paved roads now pass. Navajos today drive not only the proverbial pickup truck but compact cars, motorcycles, and all kinds of vehicles. Rather than in traditional hogans, many people live in frame or block houses in organized developments where electricity and other utilities are available. Shopping centers, restaurants, and movie theaters are being built in many larger communities. Trading posts are converted into convenience stores and gas stations. Schooling and vocational training, in ironic contrast to the dangerously high unemployment levels, are more accessible than ever. Health care, both through traditional ritual and modern medicine, is an important issue. Single-parent families are increasingly common as divorce rates parallel those of the general U.S. population. Weavers share and grapple with all the daily and long-range concerns of the Navajo people at large, balanced between their changing native milieu and the surrounding Anglo world. This balancing act is constantly reflected in their craft, through materials and designs, and in the ways they work.

A Maze of Materials. One of the most basic trends in contemporary rug production is actually a continuation of a much older tradition—the use of imported materials to cut short the time-consuming processes of collecting and brewing plants for dyeing and carding and spinning raw wool into yarn. The nineteenth-century practices of using commercial cloth as a source for bright raveled yarns, coloring wools with packaged aniline dyes, and incorporating three- and four-ply commercial yarns into handwoven fabrics set the precedent for today's eclecticism regarding raw materials.

Each year less hand-carded and hand-spun wool is seen in Navajo rugs and tapestries. Today, a weaver may choose between a variety of ready-made materials. Precleaned, carded, and dyed wool *(tops)* supplied on large spools or in loose hanks is ready to spin. Four-ply knitting worsted may be used as is or retwisted on a hand spindle to tighten and firm up the texture or split into separate strands for a very fine weaving yarn. Single yarns (made of one strand, not plied) are available in a variety of weights, textures, and colors, ready to use or to be top-dyed. They can mimic hand-spun yarns quite closely and sometimes take expert examination to identify in a completed rug. A wide array of higher-quality processed materials has been available since the early 1980s, while a narrower selection of similar materials has been around for decades.

Weavers buy these materials at local trading posts or in department stores of larger reservation and border communities and may even order them by mail from weaving specialty shops around the country. A few traders actively seek improved yarns for rug weaving and work closely with both suppliers and weavers.

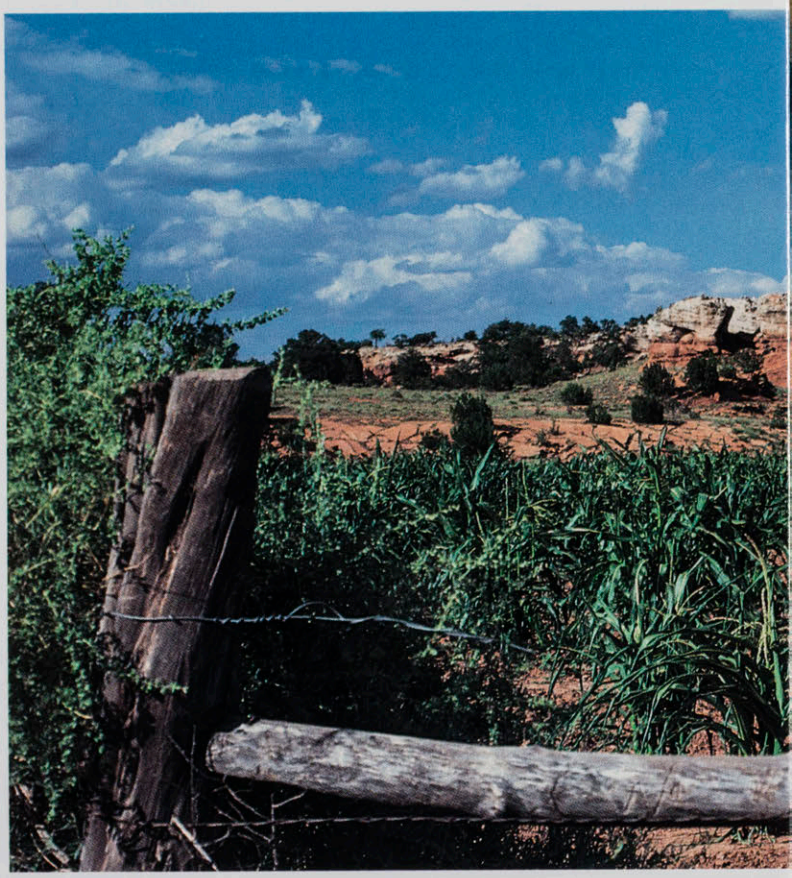
A tribally sponsored program established in 1971, the Navajo Wool Grower's Marketing Industry, promotes native wool that is commercially processed and sold in several forms to reservation weavers.

The use of ready-made materials has sustained many weavers who might have given up the craft and has given impetus to others who might not otherwise have begun. The large quantity of processed wool and other materials that mimic hand-spun yarns have unquestionably increased production rates. While certain commercial materials—shiny synthetic fibers and fluorescent chemical dyes, for example—have perhaps lowered the aesthetic quality of some weaving, good and bad results can be produced with both commercial and hand-processed materials.

Dye sources in today's textiles are a difficult issue and constitute a second trend in materials use. Home-dyed, home-spun yarns are becoming more rare although they have not altogether disappeared. In competition, there are commercial yarns that are vegetal colored but that were, in fact, dyed at the factory with commercial aniline (synthetic) substances. Also, both hand-spun and commercial yarns may have colors applied by Navajo women who specialize in dyeing rather than weaving. They may use only native plant dyes or packaged aniline dyes or their own unique combination of plants and inorganic chemicals. At least one trader supplies such women with large quantities of yarn, pays them to dye the yarns in lovely vegetal tones, and then resells the yarns to other weavers. The weavers often do not know precisely what was used for dyes although they find the pastel palette quite appealing. Dye designation by traders, collectors, and even museums are often made after the fact on the basis of visible color, an extremely imprecise diagnostic.

A third major trend in current materials is the revival of the *churro* sheep's wool. The churro sheep, an Andalusian breed well-adapted to the American Southwest, was brought to this country from Spain in the late sixteenth century. Churro fleeces are relatively clean and low in grease: the fibers are long, smooth, and shiny. Much of the best weaving of the Pueblo and Navajo Indians in museum collections today contains churro wool yarns. During the nineteenth century, however, other breeds of sheep were introduced to Navajo country in an effort to improve both wool and mutton production. Although fleeces increased in overall weight, the wool became intractable for smooth, fine spinning on a Navajo hand spindle. Despite efforts beginning in the

Navajo subsistence is traditionally based upon a mixed strategy of raising livestock, farming, hunting, gathering, and, during the past century, wage labor. Although Navajo lifestyles are changing with the times, sheep and goat herds are still important to many families. In recent decades, goats have begun to outnumber sheep in many flocks because the goats' mohair sells for as much as ten times the price of sheep's wool. Comparably little mohair or wool is kept for native use in handcrafts; most of it is sold to wool mills across the nation.



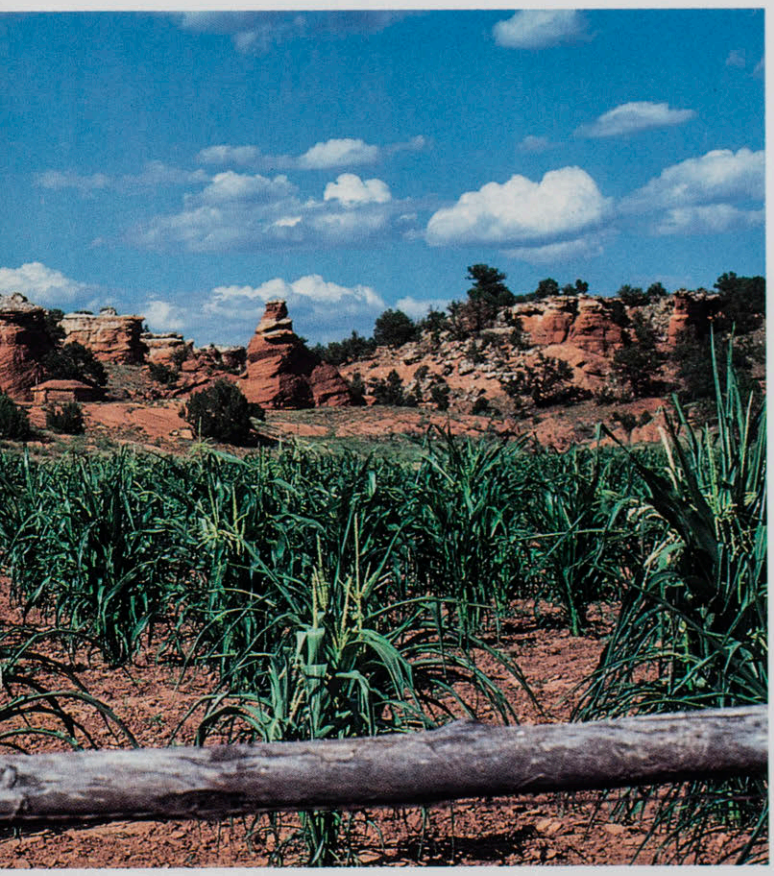
The corn plants in this field were watered by hand daily, one by one. The hogan in the background was occupied by an elderly woman who relied upon her neighboring son to help with her household and field chores. While the modern world is making inroads on the reservation—housing developments, shopping centers, paved roads, schools, and businesses—there are still Navajos who maintain traditional lifestyles. Even those whose outward lives have modernized frequently retain traditional values and attitudes toward raising a family, curing an illness, directing community meetings, conducting religious ceremonies and, most important, being a good Navajo person.

1930s to isolate the churro gene pool and regain its prized qualities, Navajo herds became a thorough mixture of sheep breeds. A more recent project sponsored by Utah State University has tried to reverse this trend and is having significant impact in certain areas. Some of the resulting fleece has been hand-spun, while there are also experiments to have some of it commercially processed for handweavers. Rugs woven with the churro wool can be identified by the yarn's silky texture, bright sheen, and ability to absorb dyes intensely and uniformly.

Design Diversification. Navajo weavers have always been eclectic in their use of designs—drawing upon indigenous motifs and personal vision while borrowing from Pueblo, Spanish, Oriental, and other traditions. In the early twentieth century regional rug styles developed around specific trade centers on the reservation. Certain color schemes and design formats became the leitmotif for weaving areas such as Two Grey Hills and Crystal in New Mexico and Wide Ruins and Chinle in Arizona. In recent times, design ideas have been readily shared through direct contacts between weavers; through a weaver's travels to trading posts, art galleries, and museums; and through media exposure in the forms of photographs, magazines, books, television, and videotapes. As communication across the reservation has improved and weavers are more carefully examining their market strategies, rug styles are less dependent on earlier regional affiliations. In fact, one weaver's repertoire may include a variety of styles. Recognizable "regional" styles may be produced many miles from their namesake area. A Two Grey Hills rug (originally from the eastern reservation) can be woven at Navajo Mountain (in the northwest) or at Indian Wells (at the southernmost end of the reservation). Rugs in the Ganado Red style are woven at Piñon to the west and in many other districts.

Styles have been consciously developed and cultivated in a few areas of the reservation over the past several decades. The most outstanding new style is the Burntwater, named for a community south of Wide Ruins and Pine Springs. This pattern combines the muted vegetal dyes known from the Wide Ruins area with the multibordered, elaborate centralized designs of the Ganado and Two Grey Hills styles. It has a strong appeal to trendy interior decorators and other contemporary buyers and has become widely popular among weavers. Not incidentally, the rise of this style coincides with the increased availability of ready-made yarns in soft vegetal colors.

The Coal Mine Mesa style woven with



Because there are many variations, the methods used to create yarns for a Navajo rug are difficult to determine if not viewed during production. Even watching the process can be confusing because of the eclectic and pragmatic approach of Navajo craftspeople. While the scene in this photograph is traditional in appearance, Bessie Sellers is not spinning her own sheep's wool, but is tightening the twist of a commercial four-ply knitted worsted yarn in order to give it a firmer texture in her weaving. Germantown yarns have been treated in a similar fashion since the 1870s. Even though a commercial material is used, the weaver invests considerable time in its preparation. Recently, in an effort to increase their spinning efficiency, a few women have used treadle sewing machine mechanisms to turn a spindle on which they twist their yarn.

a raised outline technique is another increasingly visible although not entirely new type. The style is noted by the regular alternation of two yarn colors that visually breaks up the solid areas of a pattern; in order to keep the yarns properly alternating, the boundaries between pattern areas are outlined with two-span weft floats, making the outlines appear raised. Apparently first produced in the Coal Mine Mesa area of the western reservation earlier in this century, this style has gained wider popularity. Several well-known raised outline weavers currently live in Blanding, Utah, and a trader there has attempted to promote the style as a Blanding regional trademark. A Blanding designation has yet to replace the original Coal Mine Mesa affiliation.

Who Are the Weavers? Middle-aged women are the predominant weavers in the Navajo tribe, but they are not the only ones. There are younger people who weave, and their numbers have increased markedly during just the past decade. While girls and teenagers frequently have other priorities including school and sports, it is especially women in their twenties and early thirties who are beginning to consider weaving as an appealing career option.

There are also notable cases of male weavers. In 1884 Washington Matthews reported that one of the best weavers among the Navajo was in fact a man. During the first half of this century, Hosteen Klah was an acknowledged weaver as well as medicine man. Today it appears that at least one male weaver can be found in any given community, and in some places they are more numerous.

Collaboration between weavers is common today. Many contemporary rugs are actually the product of several people's concerted efforts. Women can be seen weaving side by side at the loom, simultaneously interlacing the wefts. Sometimes one weaver will take charge of the design while the second person becomes the helper. In other instances, the work is more equally discharged.

Specialization in certain areas of production is evident. Women working by themselves to produce and sell rugs is only one of many options. Some weavers pay others to hand spin their wool for them. As mentioned earlier, specialized dyers are coloring wool for others, often via a trader as intermediary. Men in the family contribute to the construction of looms and other tools, children to the gathering and basic processing of raw materials. Rather than finishing a newly completed rug in the traditional manner by burying it in moist sand, many weavers rely on professional dry cleaning establishments.

There are formal associations of weav-

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Outsiders' suggestions for different designs are nothing new to the Navajo. Pueblo, Spanish, and even Oriental influences are evident in historic and modern weaving. Anglo traders since the last century have offered advice on rug patterns; weavers have responded selectively, in their own ways. For almost a decade, Gloria F. Ross, a tapestry *editeur* who has worked with some of the finest weaving studios in Europe, has commissioned a number of weavers, including Mary Lee Begay shown here, to make stellar tapestries designed by abstract expressionist Kenneth Noland. Relatively large undertakings when compared to the decreasing average size of most Navajo rugs today, these often measure four by six feet and greater. Bold chevrons—one of Noland's leitmotifs—and other clean geometric forms predominate. The Navajo/Noland/Ross enterprise represents an intriguing collaboration of three artistic traditions—native Navajo weaving, urban American painting, and European tapestry design.

Small children watch the growth of a rug in progress and listen to the continuous *thump-thump* of the batten against tautly stretched warps long before they actually weave. Working on their very first rugs, these seven- and nine-year olds are the daughters and granddaughters of extremely proficient weavers. As in the past, some young girls learn the craft from their mothers and other female relatives. School programs and craft classes on the reservation have had far less impact than family training. Overall, fewer children are learning to weave today because of activities that compete for their time and interests—school, sports, rodeo, household chores, television, videos, and movies.

Among the relatively elite group of professional weavers on the reservation, individuals put weaving ahead of most other activities and derive a strong sense of identity from their textile work. Even the best weavers, like Mae Jim of Ganado, however, must fit the craft into their very full lives as daughters, sisters, wives, mothers, and community members. Young adults, especially those who have finished or left school or who are just establishing a family, are newly considering weaving as a major source of income and as an appealing pastime. In the past decade this group, although small, has shown truly great promise.

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ers on the reservation that provide craftspeople the opportunity to meet together, compare their work, and discuss their strategies. Hubbell Trading Post, a designated national monument, other National Park Service sites, and regional museums regularly hire weavers as demonstrators and teachers. The Crownpoint Rug Weavers Association formed in 1968 as a nonprofit cooperative to aid women from across the reservation in selling their woven products. The group holds rug auctions every six weeks in Crownpoint, New Mexico. The rugmakers establish their minimum asking price and receive 90 percent of the selling price. The Ramah Navajo Weavers Association was established in 1984 for similar purposes focused on a single community. The Ramah weavers have been active in reintroducing churro sheep into their flocks and experimenting with pillow covers and other marketable formats for Navajo weaving. Originated as federally funded Comprehensive Employment Training Act (CETA) projects, Chapter House craft programs have also been sponsored by the Navajo Tribe through community vocational training and work projects. For the past two decades expert weavers have been hired to demonstrate and train others; the rugs produced are sold to benefit the community coffers. In fall 1987 the Navajo Tribe's Division of Labor and the Office of Navajo Women, in cooperation with the Save the Children Navajo Indian Nations program, sponsored a survey of reservation weavers and began a series of workshops on marketing skills for weavers. Although results are yet to be reported, the very fact that the tribe is investing in training sessions is an important trend.

Marketing practices are indeed changing with the times. Weavers today may elect to sell their rugs far from the local trading post, traveling many miles to get the best price for their work at a craftshop or art gallery. A number of weavers deal directly with private collectors and museum buyers. Only a few now have printed business cards, but that too may be an incipient trend.

Modern Navajo weaving shows many signs of being a strong and vital craft. Through three centuries it has retained important connections with the past and yet continues to move in new directions. Textile production has persisted through low periods such as the 1860s when the Navajo people were removed from their homes and incarcerated at Bosque Redondo, at the turn of the century when the quality of sheep's wool was low due to poor range management and interbreeding, and during the 1960s arts and crafts boom when native handcrafts were accepted uncritically and many non-Navajo copies appeared. Weavers working today demonstrate the same resilience and resourcefulness as their predecessors.

While changes are occurring in weavers' lives and woven products, it should be emphasized that the craft is still couched in native context. A young woman may speak English, drive a Volkswagen, or wear the latest fashions, but she often goes home to mother on the weekend to work on the loom and help with the fields, flocks, and household chores. Another weaver may sell her rugs to an urban art gallery, but she still includes traditional prayers in setting up and taking down the loom. Designs may include modern pictorial scenes or Cubist abstractions, yet the work is still technically and culturally linked with blanket-weaving of the nineteenth century and with the traditional Navajo worldview.

A resurgence of the craft is clearly evident. Trends today encompass changing materials and designs, attitudes, and roles. Yet weaving has not changed so much that it is in danger of losing its Navajo character. This capacity of the native craftsworkers to embrace their heritage while responding to change gives modern weaving its vitality and purpose.

Dr. Ann Hedlund is Assistant Professor of Anthropology and Director of the Museum Studies Program of Arizona State University. A weaver herself, she has worked with contemporary craftspeople in the American Southwest and in Mexico, and with pre-Columbian and ethnographic textiles from North, Central, and South America.

Hubbell Trading Post in Ganado, Arizona, is an active mercantile center, a national historic monument, and a wonderful place to visit. In the Visitors Center in 1981, Sadie Curtis and Evelyn Curley demonstrate their consummate skill as they replicate a very large rug, now part of the historic Hubbell home furnishings. Although it is occasionally noted that a Navajo will not weave the same rug pattern twice, there are many examples of such duplication. And there is apparently no taboo against doing so. In fact, traditional Navajo wool dresses, known as *biil* and still worn in certain ceremonies today, are woven of two identical rectangular fabrics that are sewn together. Women like Mrs. Curtis and Mrs. Curley who weave reproductions sometimes report that they get bored making copies, but just as often they refer to the challenges in producing exact replicas.

THE CARE OF NAVAJO TEXTILES IN THE HOME

by JEANNE BRAKO and BOB MORGAN

Navajo rugs have been common on the floors and walls of Southwest homes since the late 1800s. These textiles unfortunately have often been viewed as expendable furnishings. A new awareness of these weavings as a uniquely American art form has made it increasingly common to find Navajo rugs on exhibition in museums and galleries. Whether in a home or museum setting, these artifacts deserve the care and attention that will preserve their beauty and integrity.

Museums preserve Navajo textiles by retiring them from their original use as rugs or blankets. Artifacts are stored and exhibited in ways that minimize their deterioration. Textiles in the home, however, are often chosen particularly for their usefulness. These textiles will inevitably show wear from extended use. This process can be slowed by taking certain precautions.

Knowing more about your piece may influence the level of care and type of display that you choose. Is it a wearing blanket once used as a traditional garment or a rug made for the commercial market? Museum and gallery pesonnel can often help you identify the type of textile that you have. If you find that you own an artistically or historically important piece, we suggest that you follow guidelines for museum collections care that are more specific than those given here. See the resource list at the end of the article for more information.

The environment around your textiles will affect their longevity. Factors such as light, temperature, relative humidity, dirt, pollutants, and use affect the preservation or deterioration of all artifacts. By understanding these factors and moderating their impact, you can hope to slow the deterioration of your heirloom textiles.

Light. Light enhances the beauty of the Navajo textile, but it can also be one of its greatest enemies. Both artificial and natural light can cause fading, bleaching, color shifts, and weakening of textile fibers. One component of light, the ultraviolet (UV) wavelength, is especially damaging to textiles; you can reduce its effects by using UV filtering material on windows, fluorescent tubes, and display cases.

Screening out UV light will not prevent damage from long-term light exposure, however. The effects of light are directly proportional to the amount of light and length of exposure. Textiles are often displayed in homes for a number of years, and you must try to reduce light levels as much as possible. Keep Navajo textiles away from direct sunlight. Place textiles in areas where light levels are as low as possible. Avoid the use of spotlights as these create hot spots on the textiles. Periodically retire textiles from display.

The Natural History Museum's Navajo textile storage. Note that the weavings are stored rolled; textiles can be damaged when stored folded. The polyethylene wrapping minimizes exposure to dust, moisture, and inspect pests. Photograph by Armando Solis.

Temperature and Relative Humidity. Have you noticed that the corners of your Navajo rug are curling? High relative humidity causes the fibers of Navajo weavings to contract; this condition, along with buckling and distortion, can be corrected through blocking. Textiles are most effectively blocked as they dry, but blocking should not be attempted if you are unfamiliar with the process.

Mildew-producing molds occur in moist environments such as damp basements. Mold can permanently stain textiles. Excessively low relative humidity, however, is also damaging, causing the fibers to dry and become brittle.

Temperature influences the aging of textile materials. High temperatures can cause drying and embrittlement of wool fibers and increase the destruction caused by mildew, rot, and bacteria. Avoid displaying or storing your textile near working heaters, stoves, fireplaces, heating ducts, and radiators. Fluctuating temperatures should also be avoided. You should ideally choose a display location that experiences no fluctuation in temperature or relative humidity.

Particulate Matter and Pollutants. You should avoid letting fibers come into contact with acidic or oxidizing pollutants. Moving air currents can carry soot and noxious vapors. Try not to display or store your textiles near heating or air conditioning vents or in kitchens. Exhibiting your textile behind a plexiglass vitrine or shadowbox frame minimizes surface dirt and pollutants.

Use and Display. Later Navajo textiles were made and sold as floor rugs. The poor condition of many of these rugs is a result of years of wear and dirt. While you may wish to use Navajo rugs on the floor, it is inevitable that these rugs will eventually show signs of wear. Floor rugs need to be carefully chosen and placed, but in many cases hanging display is better for the rug.

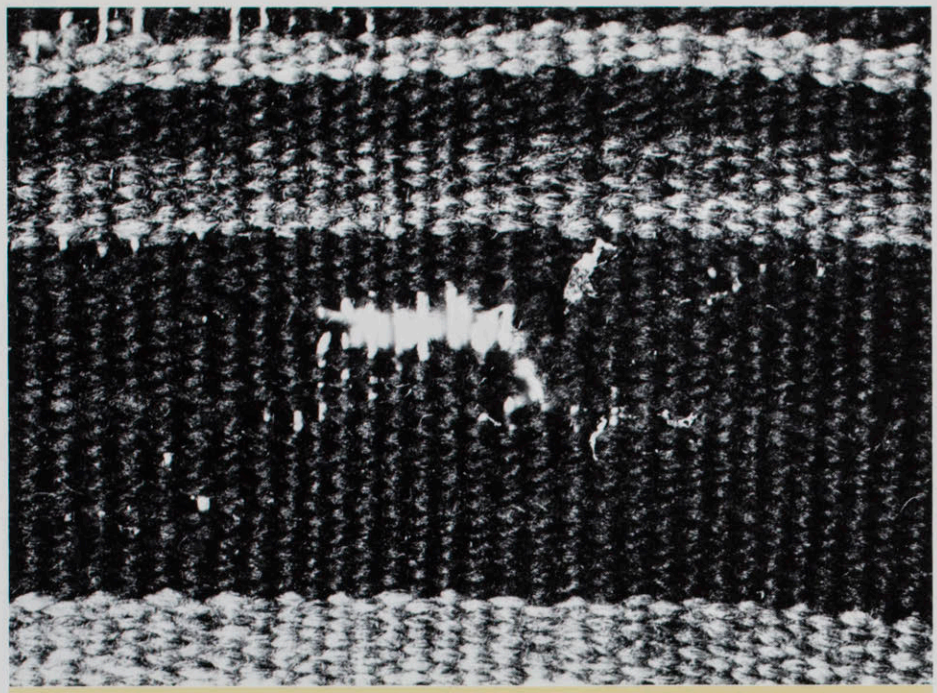
For floor use, the rug should be of a heavy or substantial weave. Use of a thick underpad, which cushions the shock of foot traffic, will decrease abrasion. This is especially important if you use a rug on a floor that is rough or uneven. The size of the underpad should be approximately the same size as the rug.

Synthetic pads that place rubber or fomaldehyde against the rug are not rec-

ommended. These pads can degrade wool fibers and will break down over time and adhere to the rug. You should avoid colored pads with soluble dyes as water damage may cause the dye to transfer onto the rug. If in doubt, dampen a small corner of the pad with water and hold a blotter against the pad. Any color on the blotter indicates potential solubility. At present, polypropylene acrylic pads are the best choice. Replace pads that have become brittle or crumbly.

Floor rugs should be rotated periodically to minimize wear and traffic patterning. If you must place furniture on the rugs, use plastic furniture coasters. Metal casters, which can rust and cause staining, should be avoided. Do not place plants on the rugs as this can lead to large rotten areas requiring extensive restoration. Moisture and moisture seepage encourage rotting, fungal damage, and insects.

Avoid placing rugs in areas of high traffic. Rugs in doorways, halls, and entryways will not last regardless of other precautions. Because floor use of rugs accelerates wear, eventual restoration is inevitable. Identifying damage early and seeking minor preventive restoration will help you avoid expensive and extensive future restoration. Pay attention to the condition of the rug's edges and selvage cord; when these areas are damaged, raveling of the side and ends occurs. Museums and galleries can often help locate professional restorers.



This Navajo rug has been damaged by the depredations of the larvae of the Casemaking Clothes Moth (Tinea pellionella)*; its casing can be seen above and to the right of the hole.*

Hanging. Hanging display should be chosen for Navajo textiles when a more conservative use is desired. This display method eliminates the abrasion and heavy soiling associated with floor use.

Any hanging method that you choose should minimize the physical stresses on the textile. The weaving should be hung in the direction it was woven; it should be positioned with the warps vertical and the wefts horizontal; and the finishing end should be at the top. Exceptions to this are pictorials such as Yei and Yeibichai weavings where design orientation is important.

The dark space between the back of the weaving and the wall is an opportune place for insects to breed, and you should check it periodically. Control light levels so that the exposed side of the weaving does not fade.

If a weaving is structurally stable, the paired Velcro hanging system is recommended. For detailed instructions on applying Velcro, write for the Canadian Conservation Institute handout "Velcro Support System for Textiles" (see resource listing at the end of the article for more information).

Fabric sleeves, which are strips of fabric sewn to one end of a textile to facilitate hanging with a rod, are not recommended because they tend to cause more stress on top of the textile usually as a result of the thickness of the support rod. Twill tapes with rings are not recommended because they support the textile unevenly and eventually cause scalloping and distortion of the textile's top edge. Never use carpet strips with tacks even when having a piece photographed because the tacks can damage warp and weft yarns.

A plexiglass vitrine or shadowbox frame will protect your hanging textile from dirt and pollutants as well as limit the need for cleaning. While this can be expensive for large pieces, it is an excellent preservation measure.

If the weaving is fragile or structurally unstable, it may require additional support such as mounting to a lining fabric and/or a rigid support. Consult with a conservator about these methods.

Cleaning. Particulate matter (dust, soot, and dirt) in or on a textile acts as an abrasive. Rugs in use on floors will require regular maintenance. The front surfaces of displayed textiles also catch dust; particulate matter is generally removed by routine vacuuming.

Vacuuming is suggested as a maintenance technique except for the most fragile textiles. Both front and back surfaces should be cleaned using a low-suction canister vacuum cleaner; do not use beater-bar vacuums as the action is too aggressive. Place nylon net or polyester screening over the vaccuum nozzle when vacuuming, especially near tassles or damaged areas.

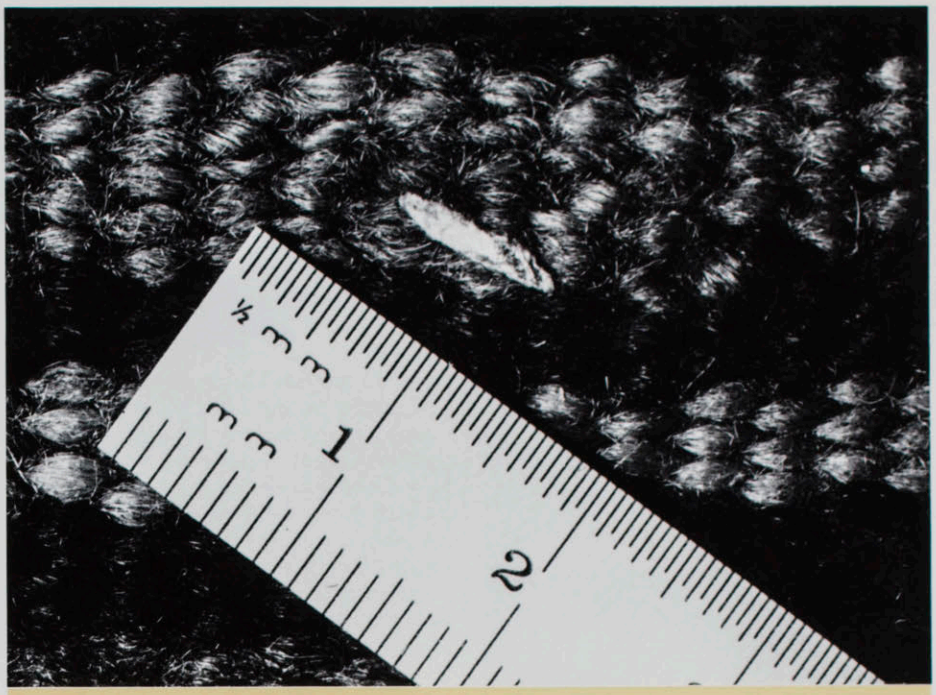
Your rug will eventually require more than maintenance vacuuming. There are several options for cleaning including localized spot cleaning, wet cleaning, and dry cleaning. The choice and extent of a cleaning method will depend on the condition of the piece.

You should not try to clean old, unidentified stains at home. The variety of problems you can encounter can often produce undesirable results. Reserve spot cleaning for accidental spills.

If any liquid is spilled on a rug, immediately blot the area with clean white toweling. This will remove most of the spill and prevent spreading or bleeding. Continue to blot until the area is dry. Call a reputable cleaner, tell them what was in the spill, and ask for their advice. Do not apply home remedies. Further professional cleaning may be required.

Water is the best solvent for most kinds of dirt, and water in combination with detergents will loosen grease-based dirt and organic stains. Wet washing is generally the preferred method for cleaning Navajo textiles when more than maintenance vacuuming is required.

Certain Navajo textiles are sensitive to wet cleaning techniques. Because of overzealous aniline dyeing and lack of



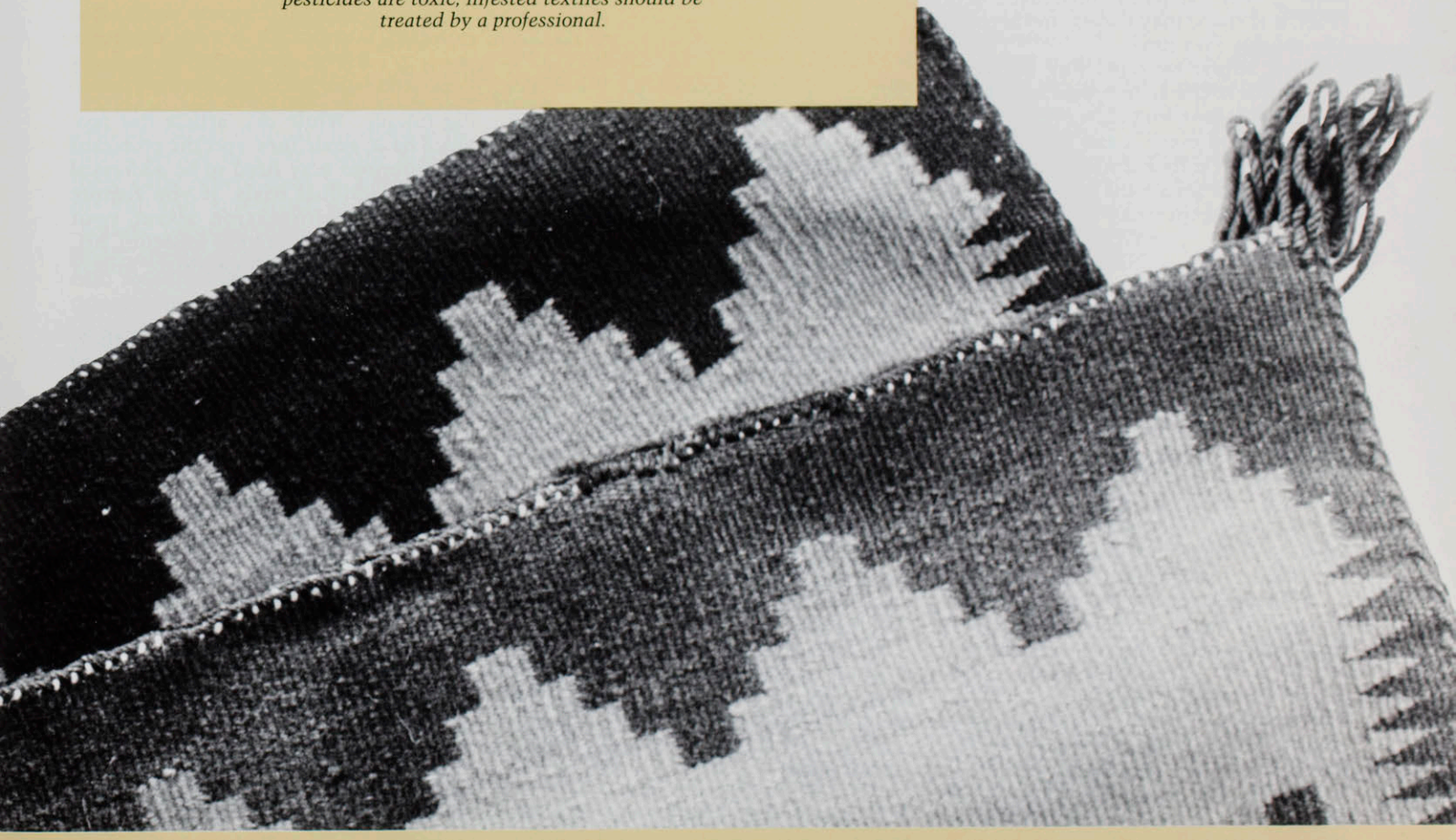
A close-up of a moth larvae casing with a millimeter scale to show how very tiny it is. Because pesticides are toxic, infested textiles should be treated by a professional.

proper rinsing to remove unbound dyes, water can encourage dyes to bleed. Most of these textiles can still be wet cleaned using appropriate cleaning agents, adequate rinsing, and proper drying techniques.

The wet cleaning of Navajo rugs is not for the novice. Ask museum and gallery personnel for referrals. Shampooing, steam cleaning, or commercial processes designed for wall-to-wall carpets are not appropriate wet-cleaning methods.

Commercial dry cleaning of textiles should only be considered as a last resort. You generally have less control over commercial dry-cleaning processes, and special problems exist. Dry cleaning occasionally causes color shifts in contemporary vegetal dye weavings and in some commercially dyed anilines. Steam processing (pressing), often used as a finishing step in dry cleaning, can cause the warps to shrink, the wool to increase in loft or felt, or the textile surface to change in texture.

Insect Pests. The best preventive measure against textile pests are cleanliness and good housekeeping. Periodic vacuuming removes moth eggs and larvae. It is in the larval stage that moths



This woven dress was exposed to light for many years and has faded; note the difference in brightness between the top and bottom areas, which were originally the same color. It is important to minimize and, if possible, filter the amount of ultraviolet light to which textiles are exposed. Photograph by Dick Meier.

cause damage by grazing on the wool. If left unchecked, repeated life cycles will destroy large areas of a weaving.

Do not store your textiles with PDB (paradichlorobenzene or moth crystals). If your rug or blanket is infested with moth larvae, you may need to have your textile treated with a fumigant or insecticide. These chemicals can be toxic to humans and damaging to artifacts, so this job should be handled by a professional.

Storage. For preservation, retire your textiles from use and store them properly, reducing the deleterious effects of light and dust. Unfortunately, storage sometimes has its own problems. Storage areas are often located in less desirable areas such as basements, attics, or auxiliary buildings, which tend to be neglected and have extreme climates. Much damage can result from humidity, temperature variation, folding, insects, or rodents. Ideal storage for textiles requires a controlled environment—one that you monitor periodically for evidence of deleterious effects.

Rugs may require cleaning prior to long-term storage (if a rug has been hanging behind a plexiglass vitrine it may not need it). Dirt and stains encourage insect pests, and stains may darken and become less soluble over time.

Store small textiles flat between sheets of acid-free tissue paper in a closed cabinet. It is best not to layer them. Large single-layered textiles can be rolled for storage, and cardboard rolling tubes that you acquire from a local carpet store are suitable for this purpose. Cover the tubes with a barrier material such as polyethylene sheeting (available at paint and hardware stores) or Saran Wrap to prevent the textile from absorbing the wood-cardboard acids. Acid-free tubes are also available; however, a barrier material is still suggested.

To roll a weaving for storage, place it flat on a clean, even surface. Position the covered rolling tube perpendicular to the textile's warp direction. Roll in the warp direction. Acid-free tissue or prewashed muslin can be rolled with the weaving to separate each turn on the roll. Do not roll more than one textile per section of tube.

Do not fold stored textiles; repeated or prolonged folding weakens the fibers and causes permanent creasing. Folded edges are also more vulnerable to surface abrasion, light, and dust exposure.

If you must fold your textiles temporarily, pad the folds with acid-free tissue and fold the weaving as loosely as possible. Refold periodically to redistribute stresses. A weaving should not be refolded along old foldlines as this will accelerate the damage.

You will also need a dust cover to protect your stored textiles. Polyethylene sheeting, Tyvek, or washed muslin are suggested to protect open shelving or cover each textile. Each material has different features.

A weaving should be hung in the direction it was woven; it should be positioned with the warps vertical and the wefts horizontal. The wefts are the fibers visible in this picture; the photograph on page 22 shows warps exposed by the voracious moth larvae. Photograph by Dick Meier.

Muslin provides no moisture barrier. Although it does act as a dust cover, muslin absorbs dust and can eventually become acidic. Exposed muslin dust covers must be washed periodically so that the acidity does not transfer to the weaving.

Polyethylene is a good moisture barrier for protection against water damage. This feature can have drawbacks as polyethylene can act as a microclimate for mold, mildew, and insects, especially if condensation occurs within the tube. For this reason polyethylene should be loosely wrapped around the textile and the ends left open. Polyethylene can be static and attract dust and fiber particles to its surface. Prewrapping with muslin is suggested.

Tyvek is a polyester web material that is more porous than polyethylene but still water repellent, minimizing condensation problems. It is not transparent and seems to be less static than polyethylene.

Families in the Southwest have enjoyed Navajo rugs in their homes for many years. With proper care, these rugs can be passed on to future generations.

Remember that the variations in materials and techniques make each Navajo rug unique. While this article has provided basic guidelines, specific problems and solutions may need to be addressed on an individual basis. If you require additional information about your Navajo rug, call your local museum, historical society, or an appropriate gallery for advice.

Jeanne Brako is Head Textile Conservator at the Rocky Mountain Regional Conservation Center in Denver. Bob Morgan is President of Southwest Textile Restorations, Inc., Denver.

Resources

Bob Morgan and Jeanne Brako, "Conservation: Navajo Textiles," *American Indian Arts Magazine (Summer 1987).*
Bob Morgan and Jeanne Brako, "For Your Information," Technical Leaflet 5 & 6, Mountain Plains Museum Association Newsletter.

Both publications provide information on the museum care of Southwestern textiles.

Kate Peck Kent, *Navajo Weaving: Three Centuries of Change.* Santa Fe, NM: School of American Research, 1985.

Materials

Acid-free tissue: fine-arts supply stores
Tyvek: some oriental rug stores
Rug pad: oriental rug stores
Velcro (sew-on type): fabric stores

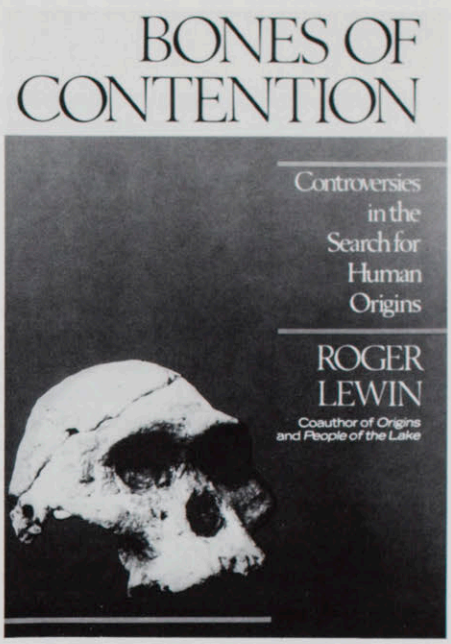
American ethnology found itself in the throes of the spirited monogenist-polygenist debate over Indian origins, that is, the single versus multiple creation theories. For all its seeming contemporary modernity and boldness, the polygenist position foreshadowed a primitive, racist legacy for late-nineteenth century science. Even the monogenists, such as Schoolcraft and Morgan, appear smugly Victorian and at least mildly racist in their condescending views of American Indian culture. Even worse, the polygenist Morton subscribed to craniology, with all its aberrations, in explaining what he saw as the childlike nature of American aboriginal culture.

Unfortunately, the author dilutes the life-blood of this debate by a veritable flood of excessive commentary and heavy documentation. Bieder's deft, energetic handling of Gallatin in the second chapter gradually deteriorates into a patchwork of long quotations interspersed with meandering summations of fact, theory, and scholastic diversions. Interestingly, some of the more salient quotes are buried among the myriad of footnotes, particularly in the final chapters.

A more serious defect is the absence of a strong general summary (perhaps in the introduction or conclusion) placing these early ethnologists in a wider historical and scientific milieu. Only sporadic mention is made of the racist implications of this burgeoning scientific inquiry during the heydey of sectional disputes over slavery. Also, are we to conclude that this fascinating new science is unconnected with nineteenth-century expansion and reform? Morgan and Squier, the only ethnologists discussed who worked in the Gilded Age, are only vaguely connected with the immense implications of Darwin's ideas on natural selection. Moreover, in the social-intellectual context of American science and education, what effect, if any, did these developments in ethnology have on schools, universities, and museums?

Finally, what is the legacy of early American Indian ethnology in view of later scientific inquiries? In his brief five-page conclusion, Bieder parenthetically alludes to Boaz and the eugenics movement as sounding the death-knell of the cultural-evolutionary themes prevalent before 1880. One is left wondering about the long-range importance of the early ethnologists in the development of twentieth-century American Indian anthropology.

William L. Cumiford
Assistant Curator
History Division


BONES OF CONTENTION
Controversies in the Search for Human Origins
ROGER LEWIN
Coauthor of Origins and People of the Lake

BONES OF CONTENTION: CONTROVERSIES IN THE SEARCH FOR HUMAN ORIGINS by Roger Lewin. Simon and Schuster, New York, 1987. Cloth, 348 pp. $19.95.

Paleoanthropology, the study of ancient humans, has always gone hand in hand with controversy. Scientists and students of human evolution bicker endlessly over where and when humankind originated, what the earliest forms of humanity looked like, and which fossil hominids are our true ancestors. Theories are advanced and abandoned, careers forged and broken, glory won and lost over a scant few fossil fragments purported to be humankind's earliest representatives.

In *Bones of Contention*, author Roger Lewin takes the reader on a delightful and informative tour of the personalities dominating paleoanthropology, both past and present. What he reveals is a field of study in which individual beliefs and preconceptions can color interpretations and personal opinion sometimes outweighs objective analysis. Controversy, Lewin asserts, is very often sparked by this clash of ideals and ideas.

Bones of Contention is not a paleoanthropology text, and students seeking new data and interpretations of the hominid fossil record may be surprised upon reading it. There are no figures, graphs, or tables. Photographs of paleoanthropologists and other researchers outnumber photographs of fossils by more than two to one. The book is less a dry scientific essay, more a vivid historical narrative, with the author concentrating on the scientists and their views rather than on the fossils.

All of which is not to say that Lewin's volume has no real scientific merit and should be dismissed out-of-hand as simple prose. Quite the contrary; by avoiding any one particular interpretation of hominid evolution, *Bones of Contention* ably presents a concise, reasonably well-structured overview of the individuals and issues that have dominated paleoanthropology since its inception. Lewin gives two chapters each to such topics as the dismissal and later acceptance of Raymond Dart's Taung child, the apparent dethroning of *Ramapithecus* as an ancestor of modern *Homo sapiens*, the myriad controversies surrounding the famous Leakey family, and Donald Johanson's discovery of the Lucy fossil. Also discussed in single chapters are subjects ranging from the storytelling elements inherent in paleoanthropological literature to the effects of an individual's world views, personal beliefs, and even religious ideology on human evolutionary studies.

Unfortunately, the volume is hampered by the generally poor photographs of important fossils and the virtual lack of a bibliography, the latter replaced by seventeen pages of footnotes at the end of the narrative. With so much information presented in Lewin's lively and engaging style, however, *Bones of Contention* remains overall an even-handed, straightforward, and insightful work. Indeed, the book is valuable simply as a reference for identifying the numerous scientists currently involved in the science as well as where they work, where and what they studied, and what they currently believe. It is also a darn good read.

While *Bones of Contention* is obviously geared toward the layperson or the beginning student, it nevertheless has valid points to make to professionals as well. Chief among these is the assertion that paleoanthropology is a science far more subjective and personal than its practitioners might like to believe. If studies in human evolution are to gain more respectability in the scientific community—a respectability Lewin implies is currently lacking—less passion and more objectivity is clearly necessary. *Bones of Contention*, by identifying the problem in detail, is a strong push in the right direction—away from controversy and toward a better understanding of human evolution.

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Pit 91 Excavation, Rancho La Brea

EARTH SCIENCES

Museum Receives a Gem of a Christmas Present. On December 23, 1987, Dr. Anthony R. Kampf, Curator of Gems and Minerals, received a phone call from a woman anxious to donate a family heirloom to the museum. He had received many such calls in the past, but through the years remarkably few heirlooms turned out to be treasures. This was to be an exception.

Later that same day the woman brought in a bracelet that she said had been in her family since 1887. Set between two diamonds as the bracelet's centerpiece was an alexandrite of extraordinary size and quality. Alexandrites larger than five carats are exceedingly rare and highly prized—this alexandrite totaled fifteen carats! The woman, who chooses to remain anonymous, said that her grandfather acquired the alexandrite in Russia. Dr. Kampf gratefully accepted the wonderful gift and promptly declared it to be one of the most important individual gem donations ever received by the Natural History Museum.

Alexandrite was so named because it was first discovered in Russia on the birthday of Czar Alexander I in 1830. The finest alexandrite comes from the U.S.S.R., but little has been mined there since 1917. Alexandrite is noted for its color change—from green in daylight to red in incandescent light, prompting some to refer to it as "an emerald by day and a ruby by night." Dr. Kampf posed another thought: "what better Christmas present than a gem that is red one moment and green the next?"

This fine four and one-half pound kunzite crystal was recently acquired by the Natural History Museum. Photograph by Harold and Erica Van Pelt.

Mineralogy Section Acquires Historic Kunzite Crystal. The Mineralogy Section has recently acquired a very important specimen of kunzite in an exchange with the Harvard University Mineralogical Museum. The fine gem-quality crystal weighs four and one-half pounds.

Kunzite is the pink gem variety of the mineral spodumene, which was first discovered in the early 1900s near Pala in San Diego County. The variety was named for Dr. George Frederick Kunz, a gemstone authority associated with Tiffany and Company of New York at the time.

The crystal acquired by the museum dates to the early 1900s. It is undoubtedly from the Pala Chief Mine, which produced some of the finest kunzite crystals ever found. The crystal was originally in the personal collection of Dr. Kunz and was acquired by Harvard University in 1933 following Dr. Kunz's death.

Mineralogy Curator Elected Fellow of the Mineralogical Society of America. Dr. Anthony R. Kampf was recently elected a Fellow of the Mineralogical Society of America. This society is the professional scientific organization of mineralogists, petrologists, and crystallographers in the United States. To become a fellow, a scientist is first nominated by his or her peers in recognition of outstanding contributions to the fields of mineralogy, petrology, and crystallography. The candidate must then be formally elected by the Council of the Society.

LIFE SCIENCES

"The Ploys of Sex" Wins Director's Award. Every other year the director of the Natural History Museum presents a $500 award to the best research paper published by a museum curator. This year Dr. Gordon Hendler, Associate Curator and Head of the museum's Invertebrate Zoology Section, received the award for his paper "The Ploys of Sex: Relationships Among the Mode of Reproduction, Body Size, and Habitats of Coral Reef Brittlestars" published in the scientific journal *Coral Reefs*.

Brittlestars are in the same phylum as sea stars and sea urchins. They are especially abundant on coral reefs, and Dr. Hendler carried out his research on the spectacular Belize Barrier Reef off the Caribbean coast of Central America. He had noted that juvenile brittlestars are often so unlike adults in appearance that they can rarely be identified. He originally set out to find whether the remarkable structural changes during brittlestar development could shed some light on the long-debated relationship between ontogeny and phylogeny (that is, the connection between changes during the development of an individual organism and the evolutionary relationship of a species). Adult brittlestars are an important component of the reef community, but the juveniles are rarely found.

Dr. Hendler discovered that small brittlestars and the juvenile stages of small and large species are particularly abundant on the green alga *Halimeda*, which is found on coral reefs throughout the tropics. Experiments showed that predation by microscopic coral polyps is a controlling factor in the species composition and size of organisms associated with living coral.

Dr. Hendler proposed that small animals and juveniles are protected in a "refuge substratum" provided by the alga, a novel plant/animal interaction, and that there are contrasting life-history patterns in species with different ways of reproducing. Species with planktonic (water-borne) larvae move to more spacious habitats as they grow larger, whereas species that bear live young and asexual species are relatively small and occupy the same protective substrata throughout their lives. This last point is a major issue in the paper; hence "the ploys of sex."

Botany Curator Dr. Don R. Reynolds a Guest in People's Republic of China. Dr. Don R. Reynolds, Curator and Head of the museum's Botany Section, spent two weeks as a guest of the Academica Sinica at the Systematic Mycology and Lichenology Laboratory in Beijing last fall. At the laboratory Dr. Reynolds gave a lecture, studied the institution's collections, and talked about China's long-range plans for the study of its mycological flora (that is, its fungi) and a future survey of all the fungi in China.

The Academica Sinica sponsors the work of foreign experts in China, who in turn supervise the course work of Chinese graduate students in the United States. They also have the opportunity to do field work in the People's Republic of China with Chinese scientists. The activities of the Academica Sinica have been in full swing since the end of the Cultural Revolution in 1976, and, according to Dr. Reynolds, their facilities are quite modern and very impressive.

Museum Botanist Coauthors Book on Hawaiian Plants and Flowers. Over one thousand rare species of plants and flowers from Hawaii, described in the new book *Plants and Flowers of Hawai'i*, were photographed by Robert Gustafson, Collections Manager of the Botany Section of the museum. The book was co-

authored by S. H. Sohmer, chairman of the Botany Department of the Bishop Museum in Honolulu.

Mr. Gustafson spent over a dozen years photographing the plants pictured in the book, including the rare and majestic red hibiscus Kokio and the near-extinct mint, Honohono. The book serves as a permanent record of the Hawaiian islands' fast-diminishing native flora, many species of which are found nowhere else on earth; the native plants that have become extinct have been replaced by exotic newcomers, also shown in *Plants and Flowers of Hawai'i.* The book is available at the museum's bookstore.

Marine Mammal Stranding Program Receives Grant—and a Big Ford Truck. The Los Angeles chapter of the American Cetacean Society provided a $1,000 research grant to the museum's Marine Mammal Program. The money was requested to purchase a one-ton capacity scale and other equipment necessary to study stranded whales and dolphins. The lack of proper facilities has precluded most institutions from thoroughly studying these stranded mammals to gain scientific insight into their biology. With the equipment purchased through this grant the museum can do more complete examinations of beach-cast specimens and contribute to the knowledge gained from the museum's world-class marine mammal research collection. The American Cetacean Society is a non-profit educational and environmental organization that focuses on marine mammals.

Natural History Museum Board of Governors President Ed N. Harrison hands the keys of the Ford F-700 four-wheel drive truck to Los Angeles County Supervisor Deane Dana. Dr. John Heyning, Mammalogy Section Assistant Curator, and John O'Donnell, Ford Motor Company representative, look on. Photograph by Dick Meier.

On behalf of Los Angeles County, Supervisor Deane Dana has accepted a donation from Ford Motor Company of a special customized truck to be used in the Natural History Museum's Marine Mammal Program. Beached whales and other marine mammals are often found along the California coastline and, locally, the Natural History Museum is the scientific institution that collects and studies these marine mammal specimens.

Removal of stranded whales and dolphins from sandy beaches presents considerable logistical problems (see "Wanted: Dead or Alive," by John Heyning and Judy Chovan, in the January/February 1987 issue of TERRA). Ford Motor Company's donation is the ideal vehicle for the recovery of the animals. It is a highly customized F-700 four-wheel drive truck with a tilting bed and a winch, similar to the new type of tow trucks, which will enable scientists to drive on the beach, pull the animal onto the bed of the truck, and transport it to the Marine Mammal Lab, where they have the proper facilities to examine the animal carefully. The new truck is capable of recovering intact the carcass of a twenty-foot, four-ton whale. Larger whales can be collected in sections with this vehicle.

In appreciation of this generous donation, the museum has acknowledged the Ford Motor Company as a Distinguished Friend and will place a recognition plaque on the wall of the main foyer.

STAFF CHANGES

Lella Smith Appointed New Chief Registrar. The museum is pleased to announce the appointment of Lella F. Smith as Chief Registrar. Ms. Smith was formerly Registrar/Exhibition Coordinator for the Armand Hammer Foundation.

She has worked with Armand Hammer since 1979, implementing systems and procedures, developing a computerized data base, and supervising arrangements for more than ninety major exhibitions, including Impressionist to Early Modern Paintings from the U.S.S.R.: Works from the Hermitage Museum, Leningrad, and the Pushkin Museum of Fine Arts, Moscow.

Due to the unusual nature of the Armand Hammer collections, which have not had a permanent home, her responsibilities were broader than those of a traditional registrar in that the collections were constantly on the move. She has traveled extensively, accompanying exhibitions to domestic and foreign locations throughout the world.

DICK MEIER

Lella Smith

Ms. Smith began working with natural history museums three years ago when she became exhibition coordinator for the *Mary Rose* exhibition, which appeared at the Natural History Museum in 1986.

Also new to the Registrar's Office is Heather Northway, Associate Registrar. Ms. Northway served with the Armand Hammer Foundation for two years.

Sterling C. Keeley, A Decade of Museum Research. After a decade of scholarly work in the Botany Section, Dr. Sterling C. Keeley is combining her research and teaching activities as Associate Professor and Chairman of the Biology Department of Whittier College. As a museum Research Associate, Dr. Keeley served as technical advisor for the museum's permanent botany exhibition, **Chaparral: A Story of Life from Fire.** She organized a major symposium on the California chaparral in 1986 that coincided with the opening of the hall. The papers from that symposium will be published by the museum, edited by Dr. Keeley. She was also awarded a contract from Stanford University Press to write a popular treatment of the chaparral that will be published in 1989.

Dr. Keeley's research will take a new direction this year when she begins to look at chloroplast DNA in *Vernonia* (a large genus with several hundred species in the aster family) systematics. She will be setting up a molecular laboratory at Whittier to serve this project. The museum is proud that Dr. Keeley has made major accomplishments as a Research Associate in Botany, and we wish her continued success in her career as one of the foremost women scientists in vascular plant systematics.

A rich tradition continues...

CONTEMPORARY NAVAJO WEAVINGS

John De Leon

To complement the important exhibition, ***Art from the Navajo Loom: The William Randolph Hearst Collection,*** *the museum's Ethnic Arts Shop is offering an expanded selection of contemporary Navajo weavings. The collection varies from small woven squares to saddle blankets and larger rugs and wall hangings. Each piece uses natural materials and displays the beautiful blending of rich color, graphic design, and painstaking technique that is the hallmark of the Navajo tradition.*

$20 to $750

THE ETHNIC ARTS SHOP
(north entrance)
Natural History Museum
900 Exposition Boulevard
Los Angeles, CA 90007
213 / 744-3336

Natural History Museum of Los Angeles County
900 Exposition Boulevard, Los Angeles, CA 90007